

About Los Alamos

As the senior laboratory in the DOE system, the Laboratory executes work in all of DOE's missions: national security, science, energy, and environmental management. Our contributions are part of what makes DOE a science, technology, and engineering powerhouse for the nation.

About Chemistry Division

With five groups and a staff of nearly 300, the Chemistry Division serves the Laboratory's missions with innovative chemical science and technology for energy research, threat identification and mitigation, weapons science, health, space research, and much more.

Our capabilities are also essential for energy security, civilian-sector R&D, and industrial partnering.

We have expertise in

- Actinide chemistry
- Isotope science
- Synthetic and mechanistic chemistry
- Chemistry for measurement and detection science
- Chemistry of materials
- Data analysis and modeling for chemical sciences
- Radiochemistry and nuclear science

Over the years, many of our postdoctoral fellows have joined the Laboratory as technical staff members. Others have gone on to academic, research, national laboratory, or industrial appointments.

The group has a vibrant student and postdoctoral program that recently includes three distinguished postdoctoral appointees.



Samantha Schrell Agnew Postdoctoral Fellow (7/15).
Aaron Tondreau, Director's Postdoctoral Fellowship (7/15).
Cameron Moore, Director's Postdoctoral Fellowship (5/16).



Staff scientist Jonathan Engle received a DOE Early Career Research Program award in 2016 for his project, "Nuclear Data for Spallation Neutron Radionuclide Production."

Opportunities

Chemistry Division offers opportunities across the employment spectrum, from student positions, to graduate and postdoctoral fellowships, to mid-career research positions. We also have active programs in industrial partnering.

Learn more about Chemistry Division:

<http://www.lanl.gov/org/padste/adcles/chemistry/>

Inorganic, Isotope, and Actinide Chemistry, group office:

(505) 606-2104

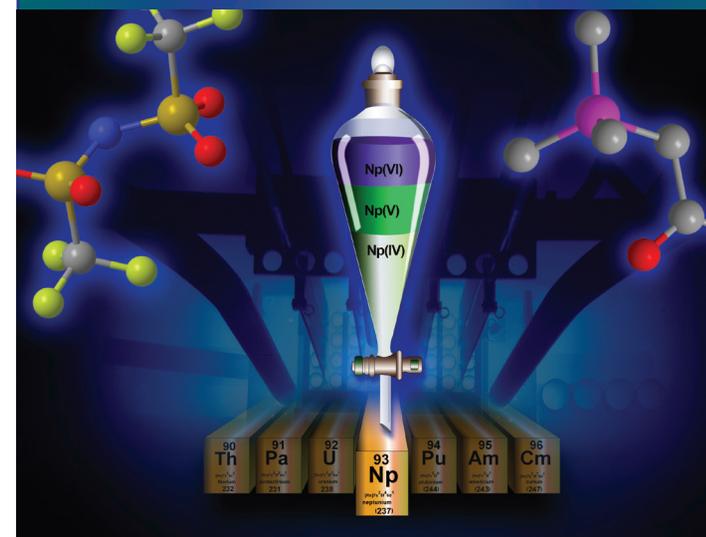
Chemistry Division Office: (505) 667-4457

Cover: Ionic liquids (ILs) are low-melting salts that have been proposed as electrolyte solutions for the electrodeposition of actinides during the reprocessing of used nuclear fuel. Work in IIAC created a room temperature IL that was used to control the formation of solid-state uranium compounds.

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CHEMISTRY

Inorganic, Isotope, and Actinide Chemistry Group (C-IIAC)

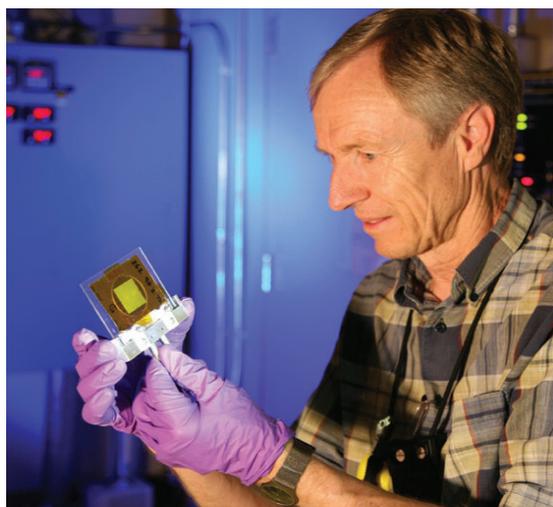


C-IIAC activities span from medical isotopes, to nuclear fuels, to fundamentals studies of actinide bonding, to advanced catalysis, and more.

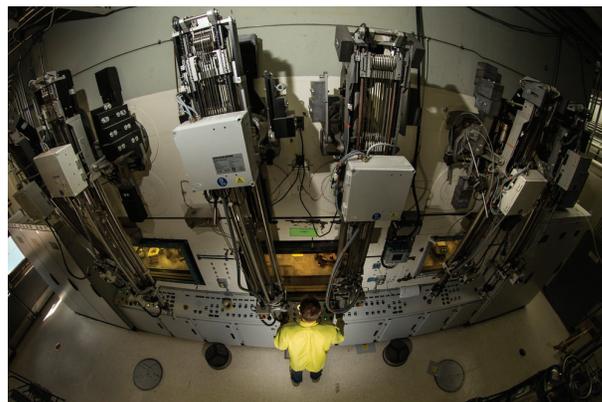
**Los Alamos**
NATIONAL LABORATORY

About C-IIAC

C-IIAC performs research and addresses mission needs related to the nation's nuclear energy, renewable energy and medical imaging arenas. Mission thrust areas within the group include actinide chemistry supporting new materials and separation processes, development of the production methods and applications of accelerator-produced radionuclides, and energy storage/production methods using chemical systems. Basic and applied research conducted within the group includes nuclear chemistry and physics, accelerator target physics, inorganic chemistry, catalysis and chemical transformations, and environmental chemistry in support of these programs. Current major sponsors include NNSA, DOE energy and Office of Science, other federal agencies, and LANL institutional support. Key collaborations exist with LANSCE, T, B, and MPA Divisions, with other groups within C Division, and with university, industrial and other national lab partners.



Ac-225 production for cancer therapy. Shown is a thorium foil test target for proof-of-concept experiments.



Isotope Production: Remote manipulators are used to safely handle radioactive isotopes, which are purified for research and medicine.

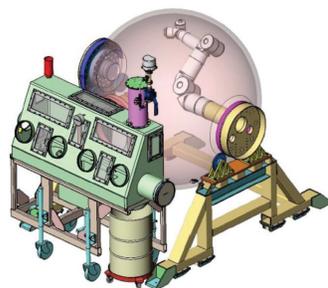
Capabilities

Radionuclide Production

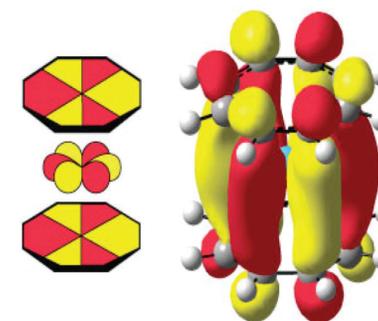
We prepare, separate, and distribute unique isotopes used for medical, industrial, and research applications. Subjects: nuclear chemistry, target development, process chemistry, separations chemistry, molecular chemistry of radionuclides.

Materials Handling, and Actinide Chemistry

We conduct fundamental research in actinide chemistry, as well as develop new chemical processes for application in manufacturing and nuclear fuel cycles, and techniques for handling rad/nuclear materials. We synthesize actinide and lanthanide compounds and materials for chemical, spectroscopic, structural and thermodynamic characterization. Subjects: inorganic chemistry, analytical chemistry and radiochemistry, materials handling.



New techniques for handling radioactive material: shown is an apparatus for collecting hazardous material from containment vessels.



Thorocene, $(C_5H_5)_2Th$, e_{3u} (5f-f)

Understanding actinide bonding. Research using K-edge X-ray absorption spectra into metal-carbon orbital mixing has shed new light on the extent of covalent bonding for actinides.

Catalysis and Separation Science

We design, synthesize, and characterize ligands and organometallic complexes for catalysis. We conduct structure-function studies of complex molecular and material systems including hydrogen storage media and biomass for renewable energy. Subjects: ligand and catalyst synthesis, tandem catalysis, novel reaction media.



Advances in Catalysis. Left: The group is advancing the concept of linking bioderived molecules and the functional groups contained within these molecules to real transportation fuel.

Right: New discoveries about the mechanism of the Noyori hydrogenation catalyst are challenging well-established paradigms for this industrially-important catalyst.